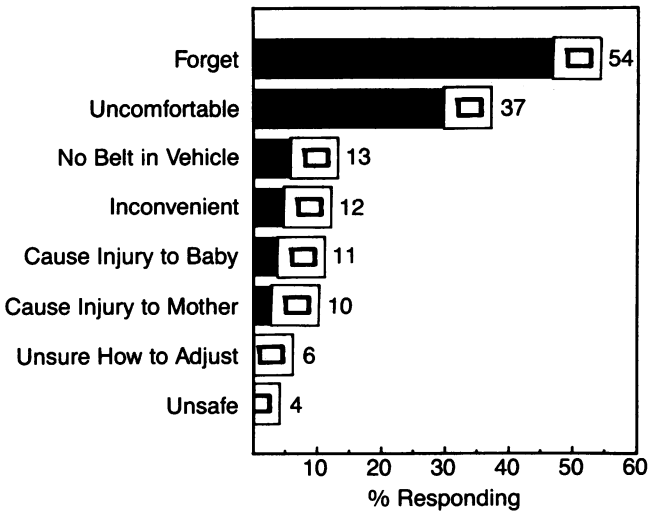

Figure 3.—Reasons for the non-use of seat belts by 145 pregnant women are summarized (more than 1 answer was given by most women).

nearly twice the national average.[1] More than half of our subjects had already experienced a motor vehicle crash. Thus, pregnant patients are at risk of injury or death from motor vehicle crashes.

Studies investigating the use of seat belts during pregnancy have shown a range of use from 32% to 90%.[10,11] This reflects not only use of seat belts but also seat belt laws and their enforcement as well as bias in reporting by subjects. Only one study made direct observations of pregnant patients in a parking lot of a prenatal clinic.[12]

Few studies have investigated changes in the use of seat belts prompted by pregnancy. Arneson and associates[10] found an increased use of seat belts during pregnancy in a retrospective study of postpartum patients. Our study population also increased the use of seat belts significantly during pregnancy when compared with use before pregnancy. The reason for this increased use was not addressed, although the change may reflect the women's overall decrease in risk-taking behavior—tobacco, alcohol, and drug use—during pregnancy.

The reasons for using seat belts during pregnancy focus on safety as well as legal issues. Our study confirms other reports[10,11] that showed that women use seat belts during pregnancy to protect themselves and their fetuses from injury. In the general population,[13,14] a law mandating the use of seat belts is the single most influential factor in increasing use. This is true for pregnant women as well, because a significant proportion of our subjects chose the law as a reason for wearing a seat belt during pregnancy.

Even with an overall increase in the use of seat belts, a significant proportion of our subjects were infrequent wearers. Attico and co-workers[15] conducted a seat belt promotion campaign in prenatal clinics in the Phoenix Area Indian Health Service. Pregnant women were given dashboard stickers to help remind them to buckle up. Although physical reminders help patients to remember to wear seat belts, the issues of correct positioning and uncertainty about the safety of seat belts during pregnancy emphasize the need to educate patients. Educators should remind patients that a proper use of seat belts during pregnancy involves placing the lap-belt portion under the abdomen and across the upper thighs, and the shoulder belt should cross the shoulder without chafing the neck and be positioned between the breasts.

Chang and associates[12] documented an increase in the use of seat belts after prenatal education classes that focused on seat belt use during pregnancy. Although the education of patients has proved effective, motor vehicle safety education programs are not routinely provided. Fewer than one of three obstetricians discuss the use of seat belts with their prenatal patients, and education material for patients about the use of seat belts is scarce in physicians' offices.[16]

Although there is a significant increase in the use of seat belts during pregnancy, a large proportion of pregnant women do not wear a seat belt consistently. To reduce maternal and fetal morbidity and mortality from motor vehicle crashes, education concerning motor vehicle safety during pregnancy must become an integral part of providing prenatal care.

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Reexpansion Pulmonary Edema in AIDS

DANIEL H. LIBRATY, MD
San Francisco, California

SPONTANEOUS PNEUMOTHORAX in association with *Pneumocystis carinii* pneumonia in patients with the acquired immunodeficiency syndrome (AIDS) has been reported with increasing frequency. Reexpansion pulmonary edema is an unusual but well-described phenomenon that can occur with treatment of a pneumothorax. A case of reexpansion pulmonary edema after treatment of an AIDS-related pneumothorax is presented.

(Libraty DH: Reexpansion pulmonary edema in AIDS. West J Med 1992 Jun; 156:657-659)

From the Department of Medicine, University of California, San Francisco, School of Medicine.

Reprint requests to Daniel H. Libraty, MD, Housestaff Office, M102, Department of Medicine, University of California, San Francisco, 505 Parnassus Ave, San Francisco, CA 94143-0120.

Report of a Case

Pneumocystis carinii pneumonia developed in a 32-year-old man with a three-year history of AIDS. His medications before diagnosis were β-carotene supplements and inhaled pentamidine, 300 mg per month. Pneumonia was diagnosed by examination of an induced sputum specimen. The patient was treated with oral trimethoprim-sulfamethoxazole—trimethoprim 320 mg, sulfamethoxazole 1,600 mg three times a day—for three weeks. Five weeks after diagnosis, the patient returned to the clinic because of mild dyspnea on exertion, pleuritic pain on the right side of the chest, and a temperature of 38.1 °C. Oxygen saturation was 94% on room air, and a roentgenogram of the chest revealed a 95% pneumothorax on the right side with no mediastinal shift (Figure 1). Initially he refused admission to the hospital but returned the following day for treatment.

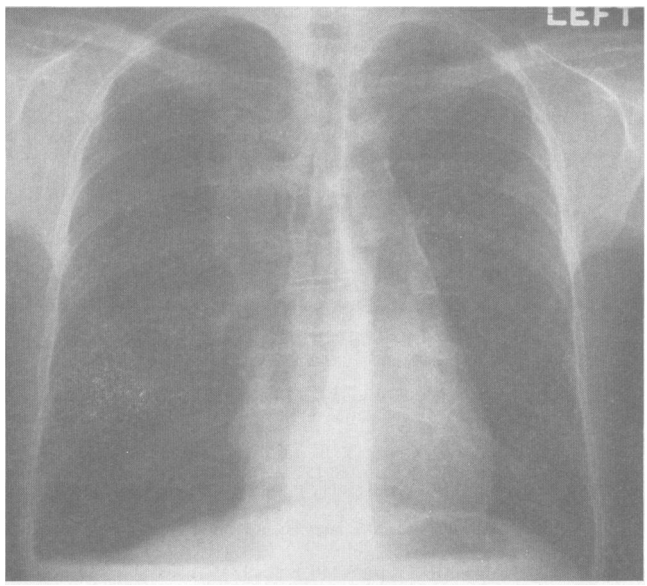

Figure 1.—Spontaneous pneumothorax (95%) is apparent on the right side in a patient with a recent history of *Pneumocystis carinii* pneumonia and use of aerosolized pentamidine.

On admission a tube thoracostomy was executed, and the patient was placed on 20-cm water suction that resulted in immediate reexpansion of the right lung. Overnight, the patient became increasingly tachypneic and dyspneic, and rales developed on the right side. He remained hemodynamically stable, but his oxygenation worsened and required 15 liters of oxygen to maintain a saturation of 92%. A roentgenogram of the chest showed unilateral pulmonary edema on the right side (Figure 2). The patient was treated with supplemental oxygen and small amounts of morphine. Within two days, the symptoms and pulmonary edema resolved.

Discussion

Spontaneous pneumothorax in a patient with AIDS was first reported in 1984[1]; since then, it has been reported with increasing frequency. Sepkowitz and associates reported a series of 20 patients with AIDS-related pneumothorax.[2] They noted that the two risk factors for the development of pneumothorax were a history of aerosolized pentamidine use and of *P carinii* pneumonia. This patient had both, and his clinical course was complicated by reexpansion pulmonary edema.

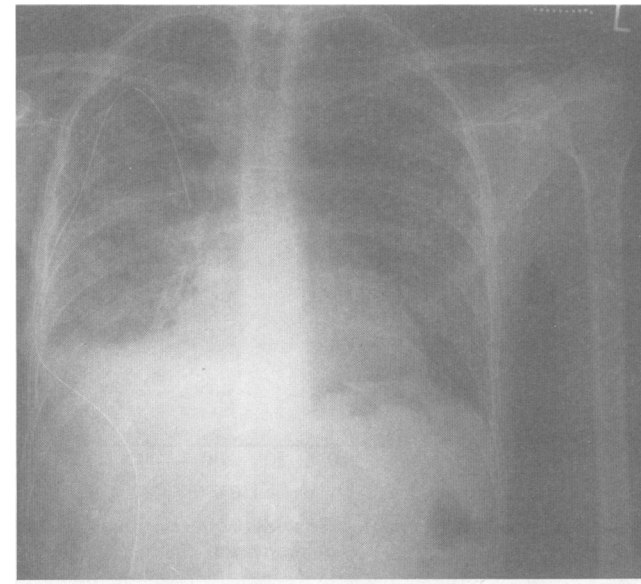

Figure 2.—Unilateral pulmonary edema is present on the right side after reexpansion of the right lung via tube thoracostomy while receiving 20-cm water suction.

The phenomenon of reexpansion pulmonary edema was first described by Pinault in 1853 after removing 3 liters of pleural fluid from a patient.[3] The development of reexpansion pulmonary edema after evacuation of a pneumothorax was first noted in the modern literature by Ziskind and colleagues in 1965.[4] Over the ensuing years, several associated clinical factors have been reported: spontaneous, as opposed to traumatic, pneumothorax; lung collapse for more than three days; and the application of high negative intrapleural pressures.[5] Indeed, studies in animals have shown that these factors contribute to the formation of edema.[6]

The exact pathophysiologic process underlying reexpansion pulmonary edema remains unclear. In 1902, Riesman described a high protein content in reexpansion pulmonary edema fluid.[7] More recent studies reconfirmed the exudative nature of the fluid and demonstrated a unilateral increase in pulmonary microvascular permeability in the development of reexpansion pulmonary edema.[8,9]

Given the association of prolonged lung collapse and negative intrapleural pressures, the effects of tissue hypoxia or of mechanical disruption of the pulmonary capillaries, or both, have been considered to lead to the increased vascular permeability. Experimental evidence for these factors has been lacking, however.[10] More recent evidence points to reexpansion pulmonary edema as a form of reperfusion injury[5,10]: that is, the increase in microvascular permeability is related to the restoration of blood flow, the formation of oxygen-free radicals, the activation of neutrophils, and the generation of leukotriene and thromboxane.

Reexpansion pulmonary edema can lead to severe hypoxemia, hypotension, or, rarely, death. As the incidence of AIDS-related pneumothorax increases, so will the potential for reexpansion pulmonary edema as a complication of treatment. Patients who have a spontaneous pneumothorax and require tube thoracostomy for reexpansion should be connected initially to water seal only, because this will generally lead to an uncomplicated resolution of the pneumothorax. Those with prolonged lung collapse or who require negative intrapleural pressures for reexpansion

should be closely observed because of the possibility of the development of reexpansion pulmonary edema.

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